

# **Breaking Free of the Quarry:** ***Leveraging Australia's Lithium Resource Into Value-Added Manufacturing***

**Dr Jim Stanford**

**Economist and Director, Centre for Future Work**

**National Manufacturing Summit, August 2019**



[www.futurework.org.au](http://www.futurework.org.au)



@jimbostanford

@cntrfuturework

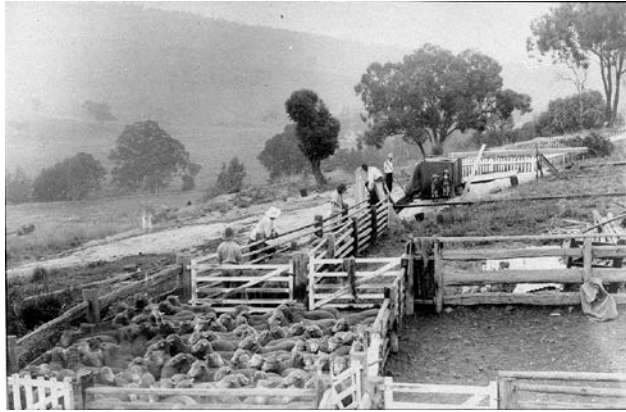
# Overview

- 1. Have we learned from our history?**
- 2. The lithium revolution.**
- 3. Australia's "lucky" once again.**
- 4. The lithium value-added chain.**
- 5. Australia's stunted role.**
- 6. Policy agenda for doing better.**

# 1. Learning from History

- Australia's economic development has been shaped by waves of “staples” development:
- Basic natural resources extracted and exported.
- Revenues used to pay for value-added imports made (in part) from our resources.

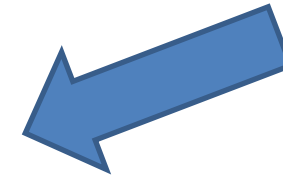
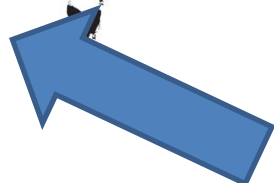
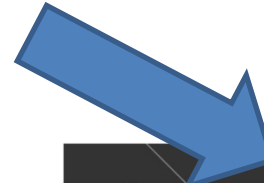
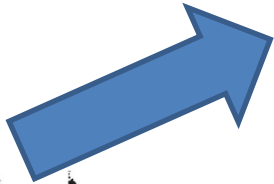
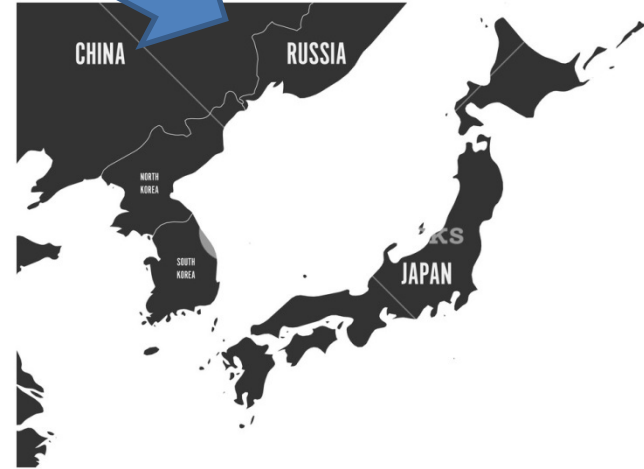
# Staples Dependence



# Benefits and Costs of Staples Dependence

- Benefits:
  - Investment, jobs, regional development, transportation & infrastructure, nation-building.
- Costs & Risks:
  - Wild price swings, foreign demand swings, cost of export infrastructure, indigenous conflict, environmental effects, lack of diversification, dependence on foreign capital, negative long-run terms of trade.

# Not a Great Deal





# Keep Digging



**1 Tonne Coal**  
**\$50**

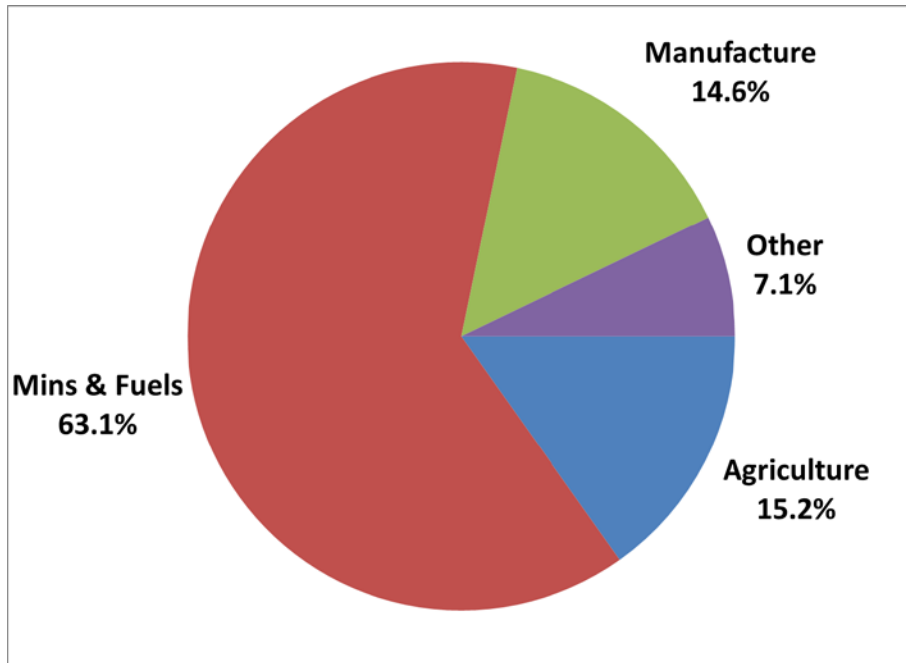


**Lexus UX**  
**\$70,000**

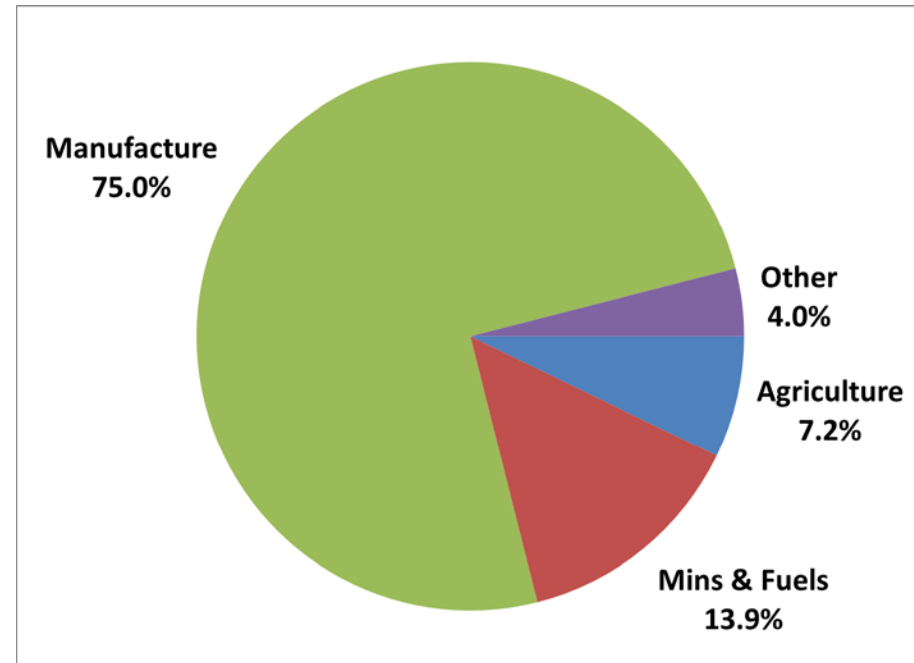
**1400 : 1**



# Composition of Trade, 2018



**Exports**

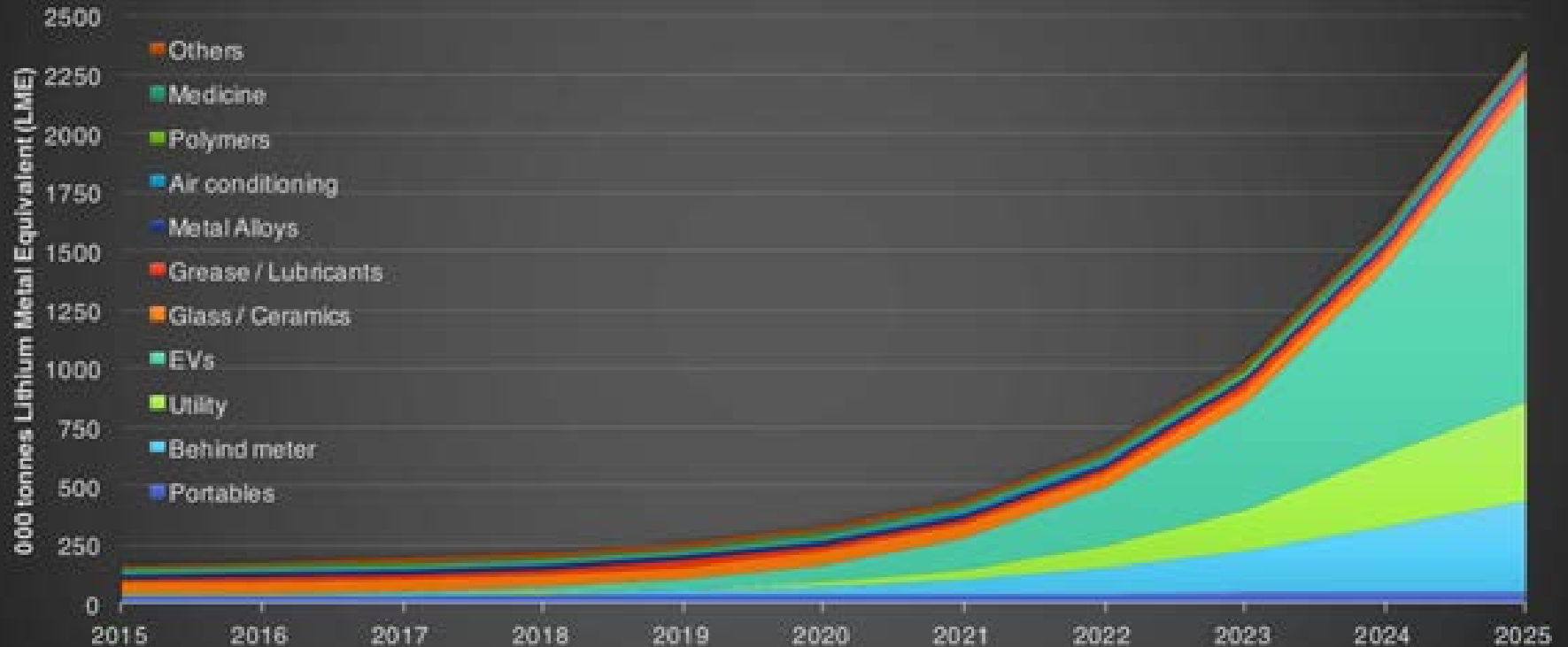


**Imports**

# 2. The Lithium Revolution

- Dramatic expansion of use of lithium-ion batteries.
  - Various forms, various uses.
- \$35 billion total sales in 2017.
  - Growing at 20%+ per year.
- Drivers of growth:
  - Electric vehicle use.
  - Home energy storage.
  - Utilities.
- Environmental benefits.
- Economic benefits.

## Global Annual Lithium Demand Projection to 2025



Source: Future Smart Strategies

# Government Response



# Advantages of Lithium-Ion Batteries

- Rechargeable.
- High energy density.
- Low self-discharge.
- Easily aggregated; flexible applications.
  - Small (electronics), medium (cars), big (homes), ultra-big (utility storage).

# Disadvantages of Lithium Batteries



# 3. The Lucky Country (Again)

- Lithium is very plentiful.
  - One of the original elements at “big bang.”
- Quality of deposits is what is key.
  - Similar to bauxite.
- Australian hard rock deposits are high quality (concentration) and accessible.
  - Almost all in WA; some in NT.
- Third largest proven deposits (more to come).
- Already largest global producer.
  - \$1.2b spodumene exports in 2018.



# Two Ways to Get It



# Two Main Ways to Process It



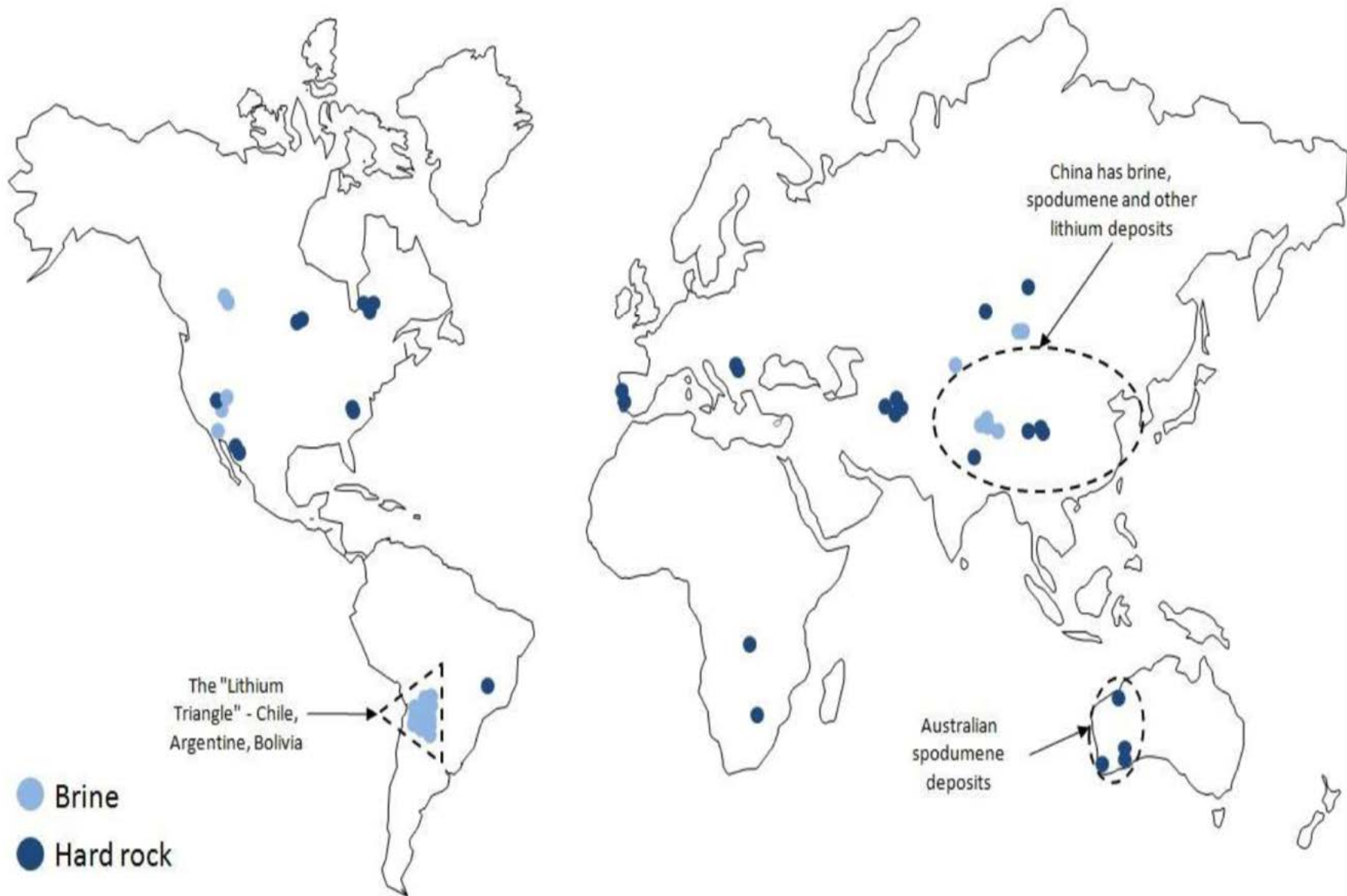
**Lithium Carbonate**

*60%, cheaper, brine*



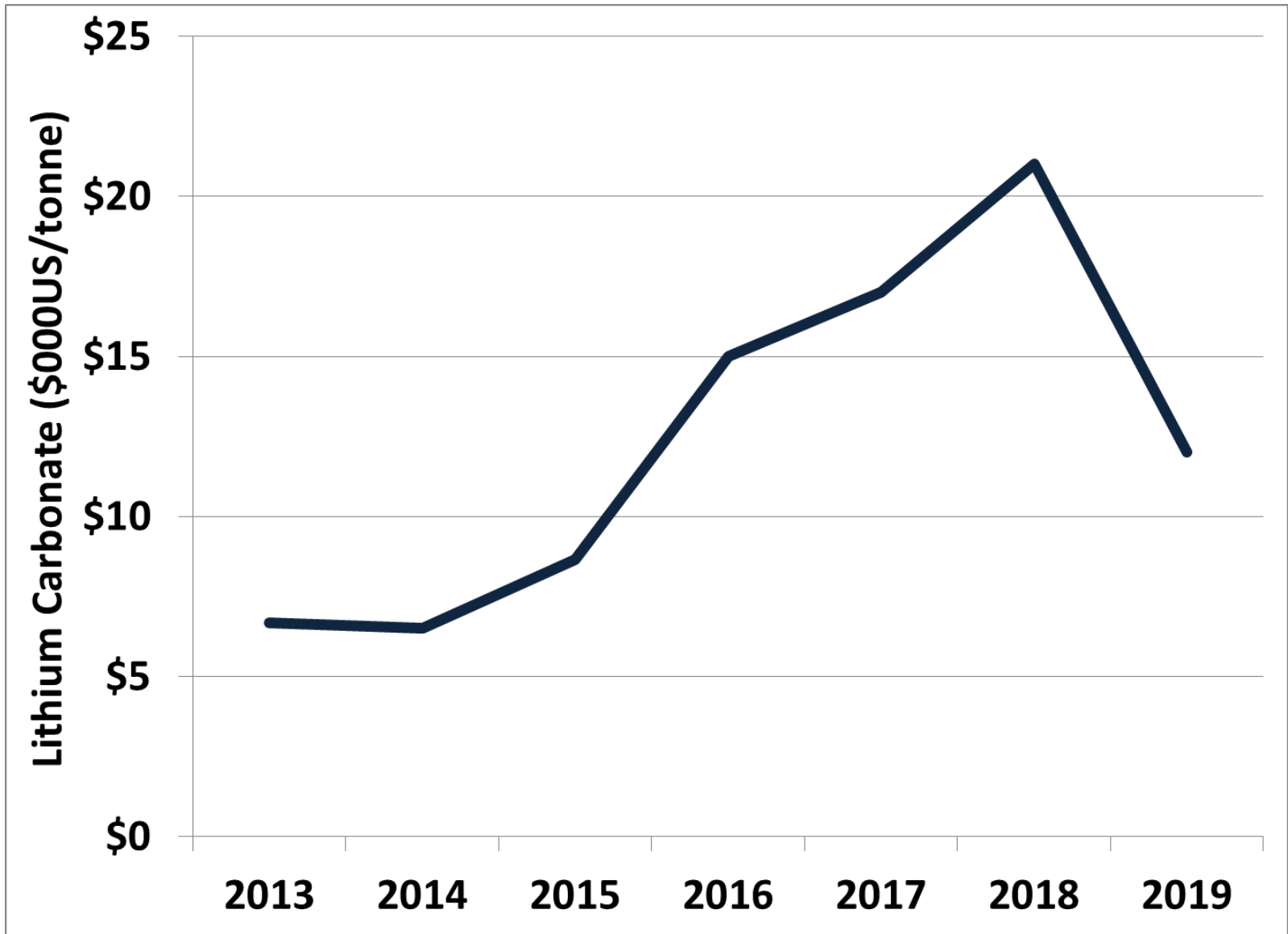
**Lithium Hydroxide**

*Higher price, growing share*





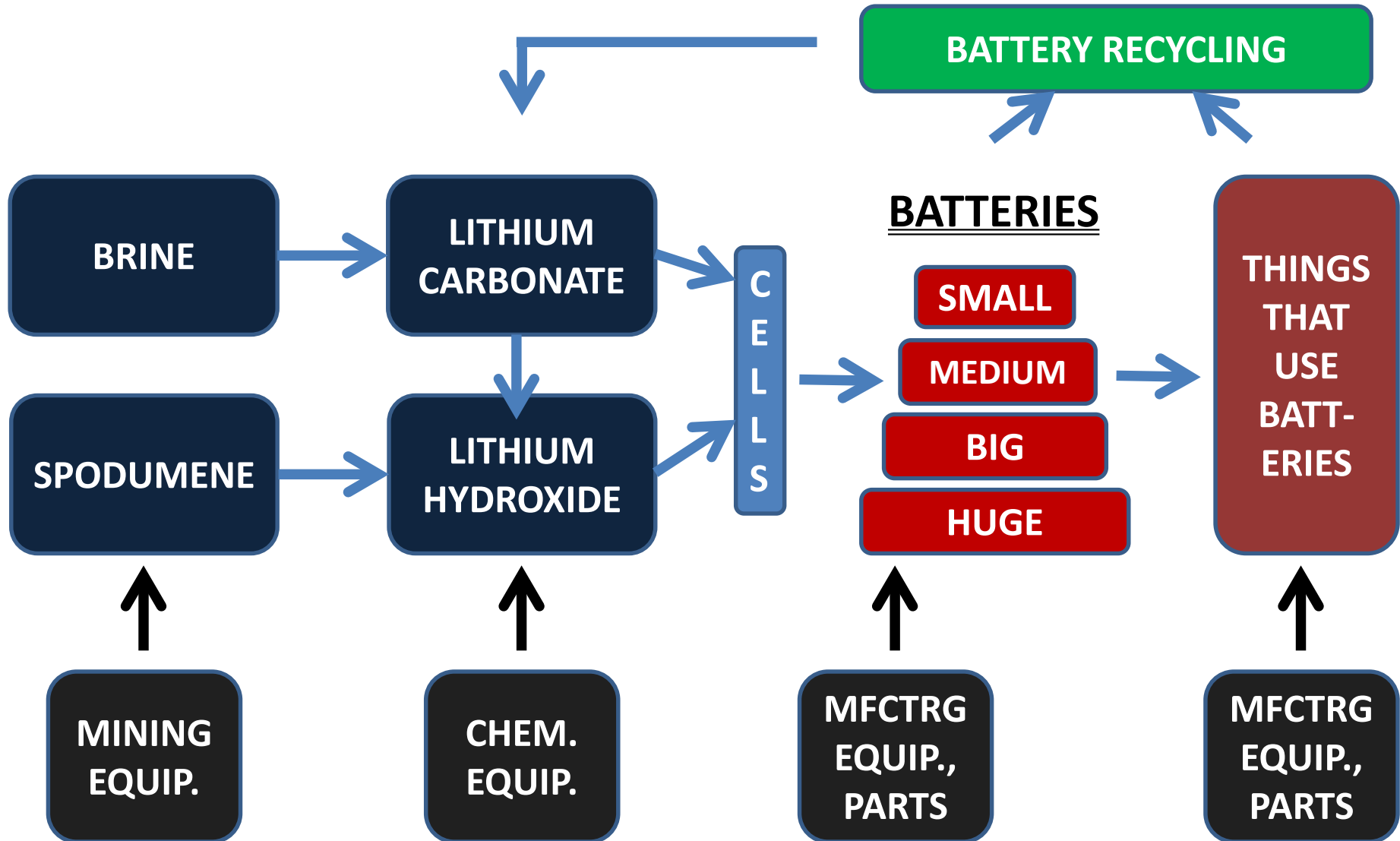
# Where Have I Seen This Before?



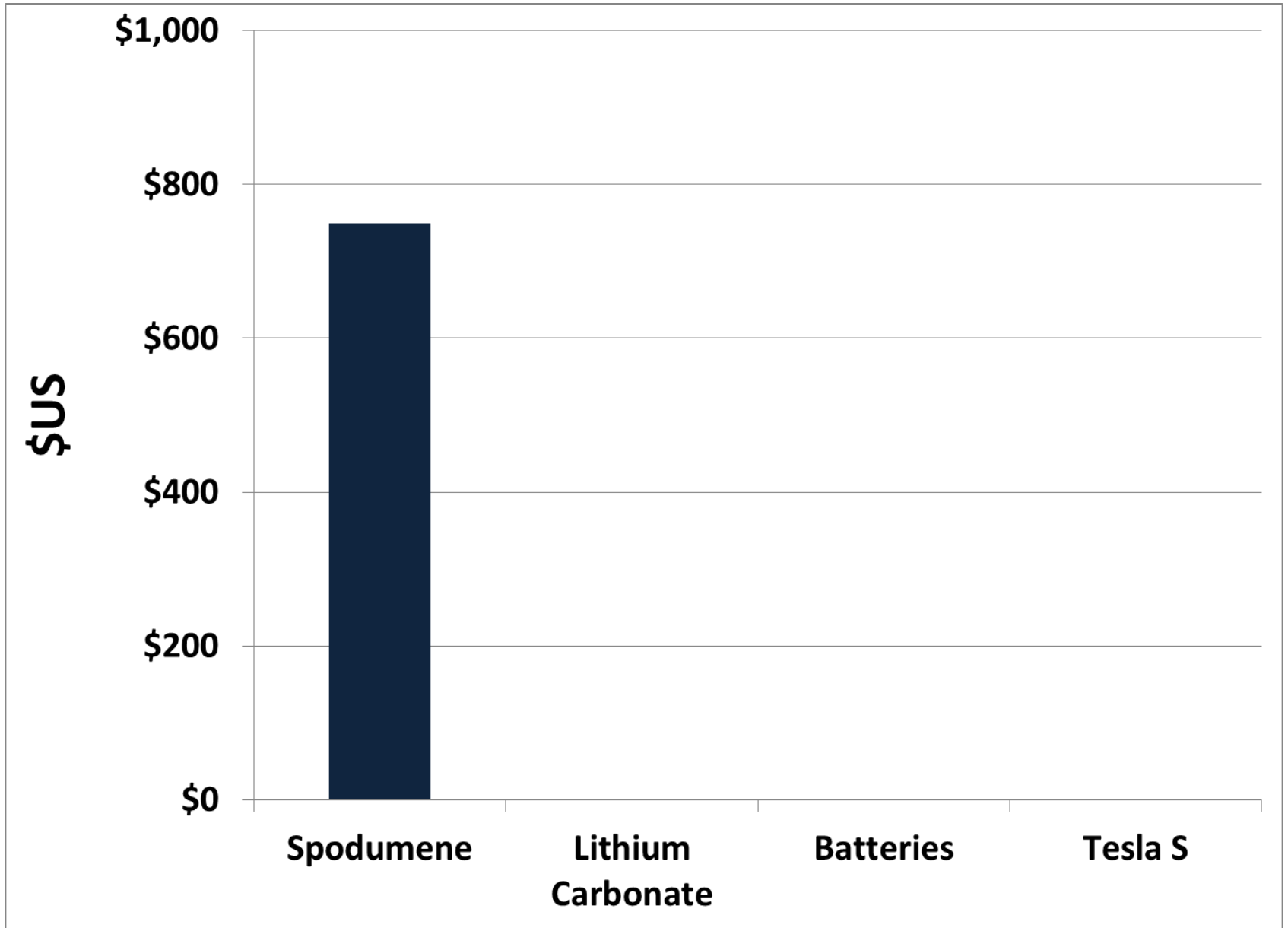
# Where Have I Seen This Before?



# 4. Lithium Value-Added Chain

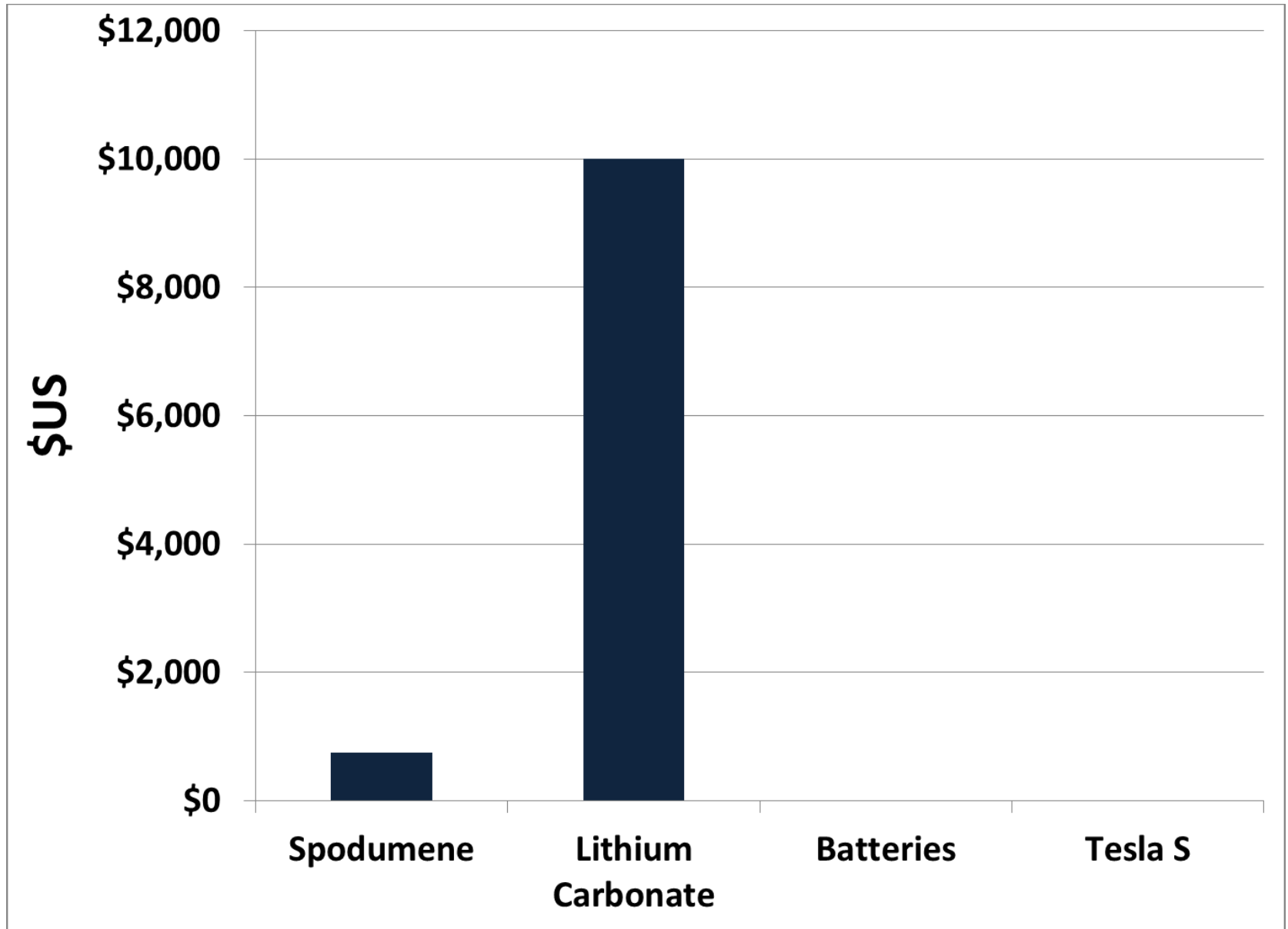


# Follow the Money

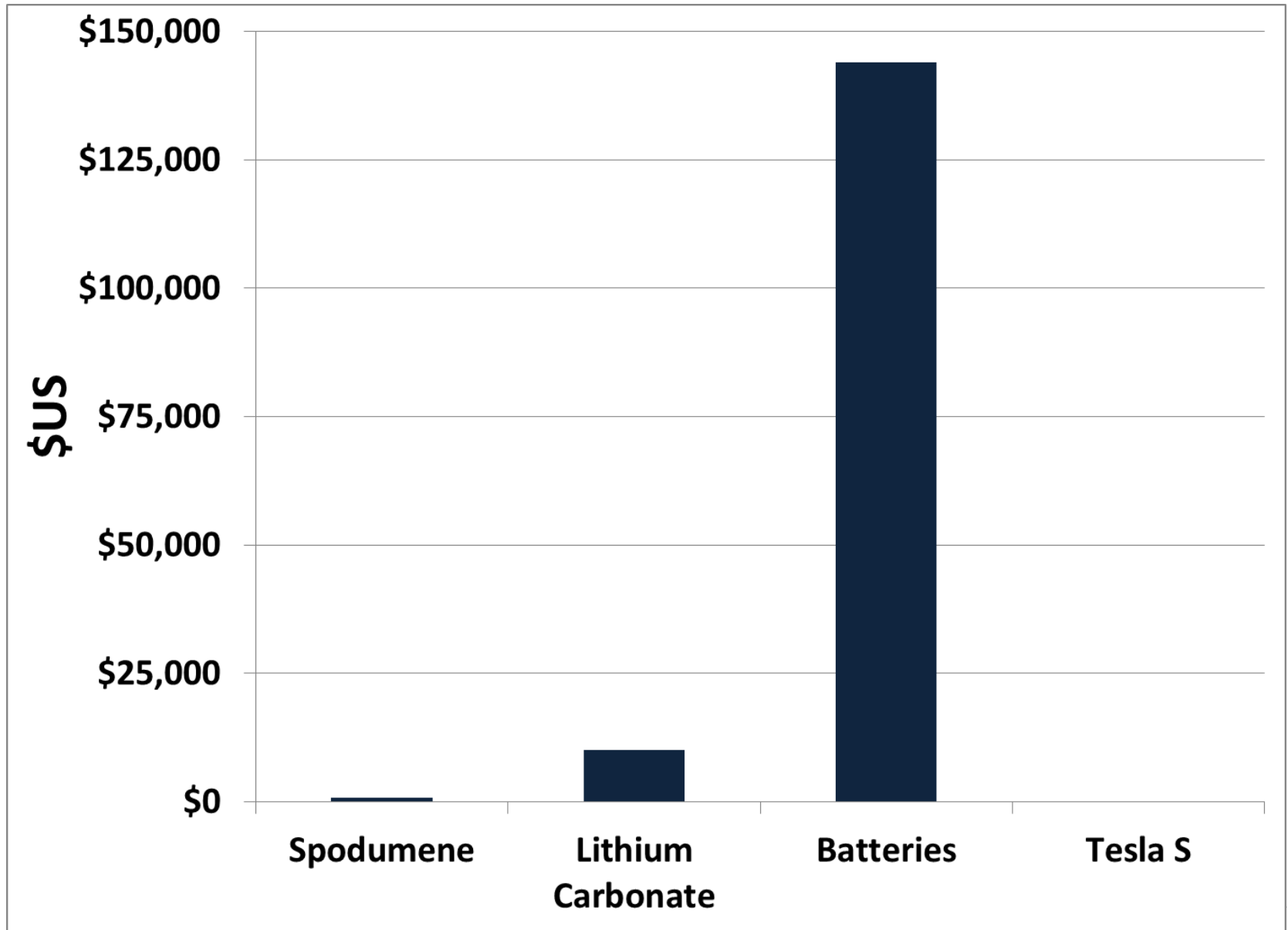




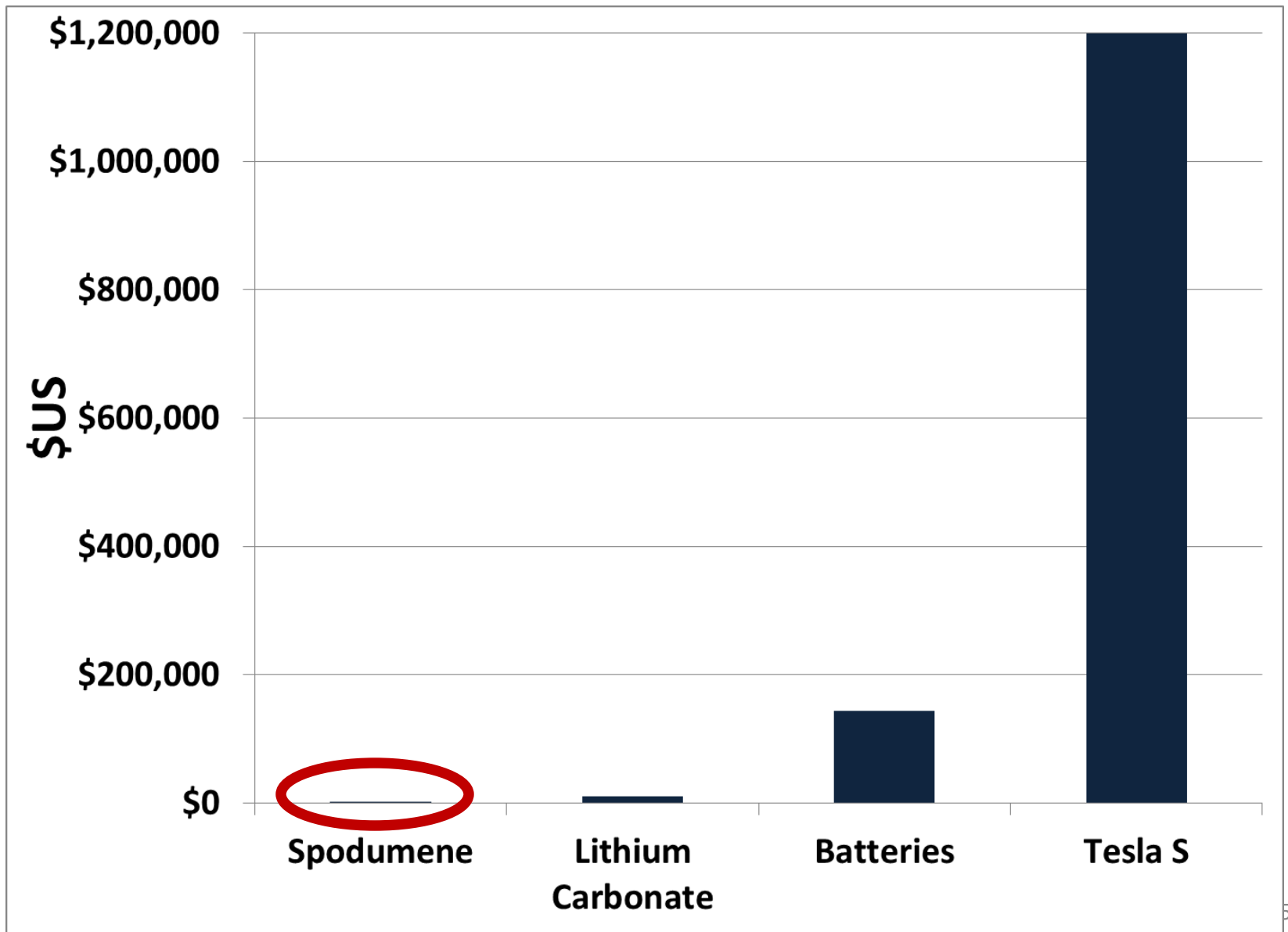
# Follow the Money



# Follow the Money



# Follow the Money



# Keep Digging



**1 Tonne Spodumene**

**\$750**



**Tesla S**

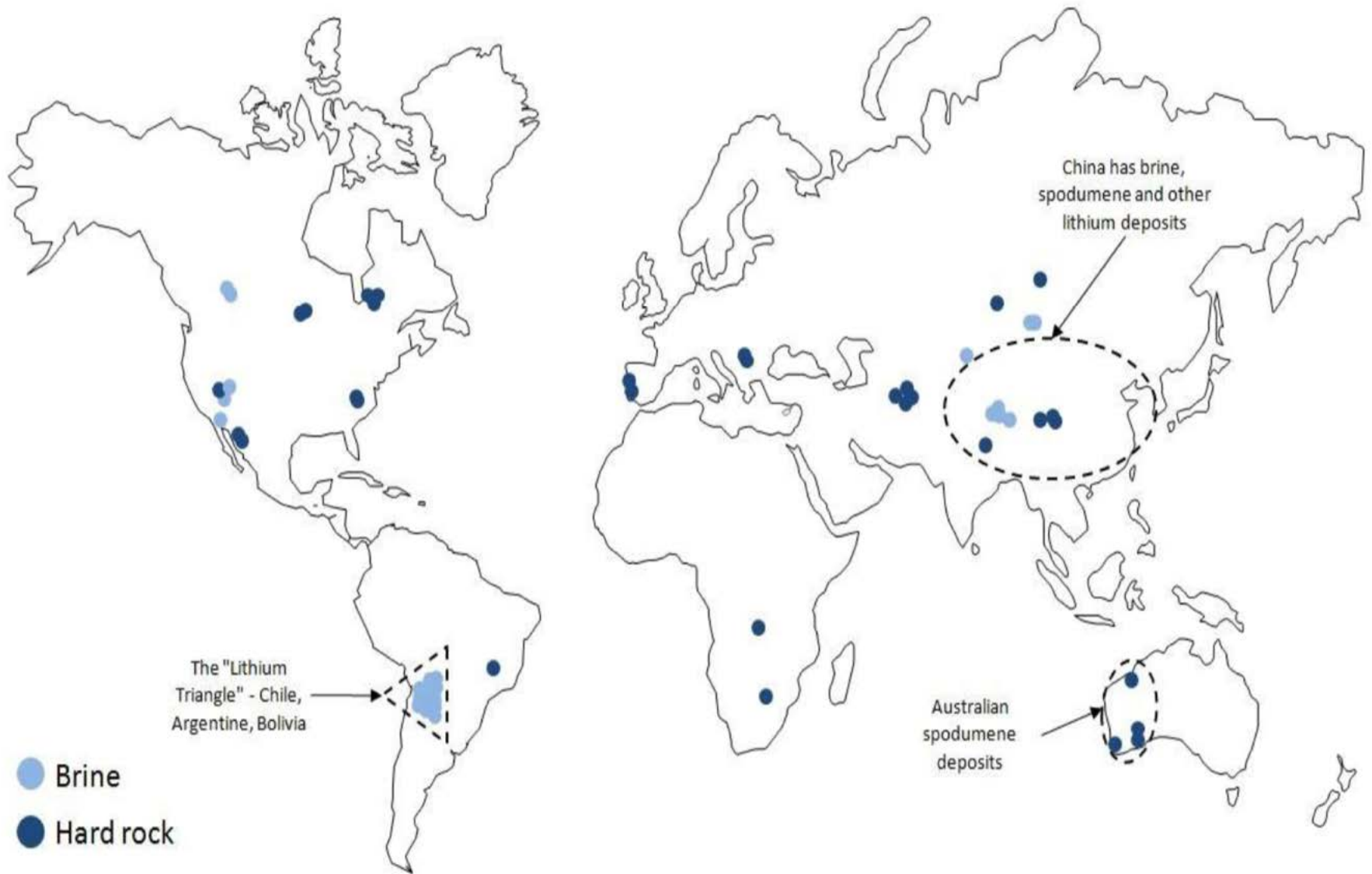
**\$100,000**

**135 : 1**

# 5. Where's Australia?



# Global Lithium Reserves



# Global Battery Capacity to 2023

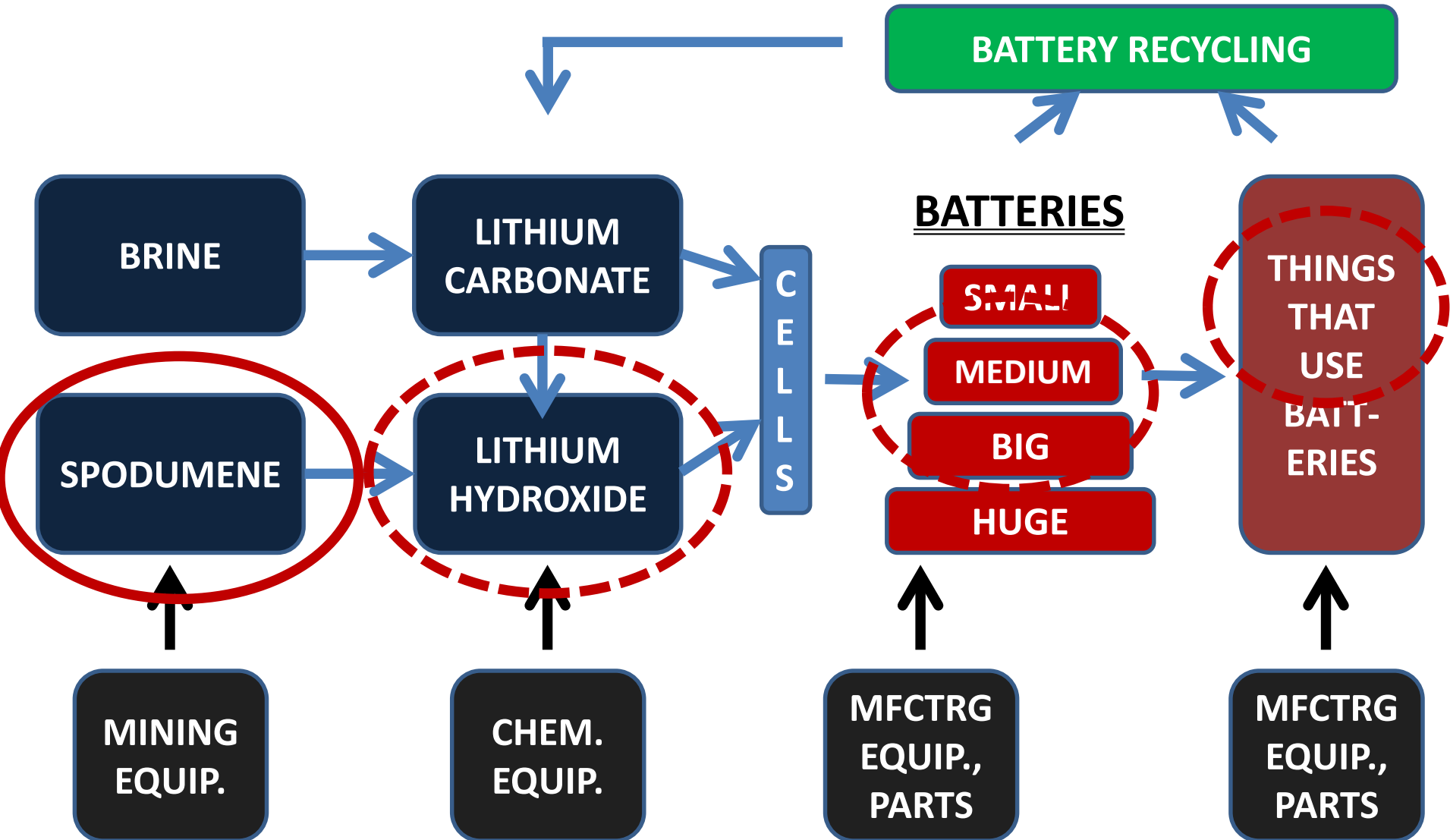




# Global Battery Manufacturing

- China has over half of current manufacturing capacity.
- Labour costs not really the issue (other than small batteries).
  - Aggressive domestic EV strategy.
  - Aggressive industrial policy.
- Other producers are higher-wage OECD countries.
  - Japan, Korea, Europe, US.
- Example: Germany's ambitious strategy.

# Lithium Value-Added Chain



# Hopeful Steps to Adding Value

- 3 lithium hydroxide facilities in WA being built.
  - 2 more possible.
- Potential battery factories.
  - Energy Renaissance (NT), 1 Gwh, pilot within year.
  - Imperium 3 (QLD), 15 Gwh, feasibility study.
  - 3 producers in SA linked to home solar battery scheme.
- EV potential.
  - Volgren hybrid & all-electric buses (Dandenong).
  - SEA Electric vans (LaTrobe).

# 6. Making the Most of Our Luck

- Australian advantages for value-add work:
  - Proximity of the resource.
  - Growing domestic lithium hydroxide supply.
  - High transport costs for big batteries.
  - Huge potential domestic market (EVs, home solar, utilities & storage).
  - High-skill workforce.
  - Improved competitiveness (\$AUS).
  - Experience, capacity in vehicle manufacturing.

# Hurdles to Overcome

- Lack of domestic technological capacity; dependence on foreign producers.
- Regional fragmentation and competition.
- Small scale of domestic market.
- Slow start compared to other jurisdictions.
- Complacency and passivity of policy-makers.

Red Herrings: labour  costs, environmental  rules.

# Don't Make the Same Mistakes

- Exporting raw spodumene is a chump's game.
  - Global supply is abundant.
  - Costs will fall with technology.
  - Price swings (like any other extracted commodity).
- Despite Australia's advantages, no industry will develop here spontaneously.
- Needs foresight, planning, and intervention to make it happen.
  - Just like every other producer has done it.

# Making it Happen:

1. Require 1<sup>st</sup>-stage refining of spodumene in Australia as condition of development approvals.
2. Establish a national battery industry task force: with buy-in and money.
3. More funds for Australian battery research (CSIRO, universities, government).
4. Access to equity capital, loan guarantees from govt funds (CEFC, regional funds).
5. Targeted fiscal support for capital spending through ITCs, R&D incentives.



# Making it Happen (cont'd):

6. Domestic content in public procurement (EVs, utility purchases, home subsidies, defense).
7. Get act together on climate policy (electricity, EVs): consistent, forward-looking framework.
8. Rapid ramp-up of battery-related vocational skills (TAFEs).
9. Duty remission for integrated battery exporters/importers.
10. Mandate domestic battery recycling from all sources.

# Conclusions

- Last year's Summit, Ross Garneau: "Australia can be a sustainable manufacturing superpower."
- Seizing the value-added opportunities from both our resource endowment and our growing use of lithium-ion products would be a big step to getting there.



**Thank You!**

[www.futurework.org.au](http://www.futurework.org.au)



@jimbostanford  
@cntrfuturework